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Infant mortality in
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New York

1915

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Box 13

Infant Mortality in Fall River, Massachu-
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Among 833 Infants Born in June,
July, and August, 1913

Reprinted from the Quarterly Publication of the
AMERICAN STATISTICAL ASSOCIATION,
June, 1915

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BY

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1915

INFANT MORTALITY IN FALL RIVER, MASSACHUSETTS—A SURVEY OF THE MORTALITY AMONG 833 INFANTS BORN IN JUNE, JULY, AND AUGUST, 1913.

The present study of infant mortality in Fall River originated with the Civic Department of the Woman's Club of that city, which was interested in practical measures for reducing the high infant death rate known to exist there. The data for the investigation were collected by the members of the District Nursing Association of Fall River; the information was later transcribed upon the infant mortality blank prepared by the Russell Sage Foundation. The author of this paper holds himself responsible neither for the blank used in the compilation nor for the completeness of the record of the various items tabulated. He has reason to believe, however, that the records which have come under his sight for study have been prepared with care, and that they are in all probability accurate statements of the conditions found by the members of the Nursing Association at the time of their visits.

This investigation covers the history of 833 infants born in Fall River during a period of 3 months—June, July, and August, 1913. These cases were not all registered at the time of birth. A thorough method of canvassing was employed by the nurses to locate babies born during these three months; some were not discovered until their death certificates were examined. Babies were visited from time to time, and a record was made of the findings at each visit. This record covered the condition of the baby, that of the mother, the mode of feeding, housing conditions, and other items of interest. A final visit was made on the anniversary of birth, at which time a fairly complete record was made.

Of the 833 births, 30 were recorded as stillbirths. One hundred and fifty-two additional deaths are known to have

occurred in the course of the year. No data are available for one of these deceased infants; it has seemed wiser, therefore, to eliminate it both from the records of births and from those of deaths. This study will be concerned, then, with 30 stillbirths, 802 live births, and 151 deaths.

Death Rate. If the 802 infants born alive had been kept under observation throughout the entire year, or until earlier death, the death rate in Fall River would have been 187 per 1,000 live births. As a matter of fact, 116 infants were lost from observation during the year. Of this number, 22 were under observation less than 1 week, 28 less than 1 month, and 106 less than 4 months. None of the 116 was under observation more than 6 months. The death rate of 187 per 1,000 is therefore an underestimate, since some of these 116 children, in all probability, died outside of the confines of Fall River and were not recorded as deceased. We have, therefore, constructed the annual death rate by summing up the 4 quarterly death rates, correcting the denominator at each period for departures of infants from observation. These 4 quarterly rates are 131.8, 15.1, 36.4, and 19.0, respectively. The annual death rate is therefore 202.3.

It should be remembered that this rate of 202.3 per 1,000 live born is for a limited number of infants born during the three summer months of June, July, and August. As will be shown later, there was a high mortality during the first few weeks of life, which was doubtless due, in part, to the effects of the season. This death rate must not, therefore, be considered as identical with the annual death rate, which is probably somewhat lower than this figure. According to Verrill,* the infant mortality rate in Fall River was 177.6 per 1,000 births in 1908; the Children's Bureau gives it as 186 per 1,000 in 1910. In any case, the rate in Fall River is almost twice as high as that now recorded for a number of large cities where efforts have been made to conserve infant life.†

* Infant Mortality and Its Relation to the Employment of Mothers in Fall River, Mass. Charles H. Verrill, U. S. Bureau of Labor. Transactions of the Fifteenth International Congress on Hygiene and Demography, Washington, 1913, pp. 218-237.

† In this discussion we have assumed the identity of the death rate and the infant mortality rate. This involves a slight error, which is not, however, sufficiently significant to justify an attempt at correction.

Stillbirths. There were 30 stillbirths in the series of 832 births—a rate of 36.0 per 1,000 births. This rate compares favorably with that of other cities. The number of stillbirths per 1,000 born as recorded for Johnstown, Pennsylvania, in the recent study by Emma Duke for the Children's Bureau,* was 56.7 for the year 1911; that for the city of New York for the year 1912 was 46.5; and that in the series of 10,000 cases born at Sloane Hospital † and studied by Holt and Babbitt was 44 per 1,000. The last figure excludes abortions.

The mothers of 8 of these 30 stillborn children were occupied in the mills during pregnancy; 19 mothers were engaged in housework only. The stillbirth rate was higher among the workers than among the housekeepers, the rates being 44 and 31 per 1,000, respectively. It should also be noted that 21 of these stillborn children were delivered by physicians and 6 by midwives; the stillbirth rate was then 40 per 1,000 for the former group and only 23 per 1,000 for the latter. The much higher rate for those delivered by physicians is doubtless influenced by the fact that physicians are likely to be called in cases which present difficulties too great for the midwives to handle.

Sixteen of the stillborn were males and 8 were females; the sex of the remaining 6 was not stated. Six, or 20 per cent., of the stillborn were premature.

Age at Death. The following table gives the number and percentage of deaths, and the rate per 1,000 live births, for each period of life:

* Infant Mortality: Results of a Field Study in Johnstown, Pennsylvania, Based on Births in One Calendar Year, by Emma Duke. Children's Bureau, U. S. Department of Labor, Washington, 1915.

† Institutional Mortality of the New-born. Holt and Babbitt. Journal of the American Medical Association, January 23, 1915, pp. 287-290.

TABLE I.
INFANT DEATHS, PERCENTAGE OF TOTAL, AND DEATH RATE, BY PERIOD OF LIFE.

Period of Life.	Deaths.		
	Number.	Per Cent. of Total.	Rate per 1,000 Births. (a)
1st Year.....	151	100.0	202.3
1st day.....	25	16.6	31.2
1st week.....	27	24.5	47.4
1st month.....	62	41.1	79.7
1st quarter.....	102	67.5	131.8
2d quarter.....	11	7.3	15.1
3d quarter.....	25	16.6	36.4
4th quarter.....	15	9.9	19.0

(a) This column is corrected for the 116 infants who were lost from observation during the year.

The greater part of the mortality occurred during the first few weeks of life. The figures are in general similar to those presented for Johnstown by Miss Duke, and confirm the findings of Holt and Babbitt for the births studied at Sloane Hospital. The percentage of all deaths occurring during the first quarter year, 67.5, is higher than that found by Miss Duke for Johnstown, where the figure was 55.1. The corrected death rate for the first quarter, 131.8, is also much higher than that recorded by Verrill for Fall River for 1908; namely, 72.3. Our series, then, does not justify the comment of Verrill that the excessive infant mortality of Fall River is to be found, not in the earliest period of life, but at the ages over three months. Our conclusion must be that the excess of infant mortality is pronounced all along the line, being especially marked during the first month and, indeed, the entire first quarter year of life. It is also possible, of course, that the difference between the results of the two Fall River studies can be accounted for by the fact that our series is one of summer-born children, whereas that of Verrill covered the entire year.

A considerable number of the infants under observation were evidently born with serious physical defects, which resulted in death during the period soon after birth. A number of factors involved in this phenomenon present themselves for

consideration. We shall first attempt to get additional light on the subject from an examination of the causes of death.

Causes of Death. There were available for this analysis of cause of death not only the statement registered on the death certificate by the physician, but, in many cases, the statement of the visiting nurse as well. This additional information was often of value in the assignment of the case to the true cause. Thus the physician's statement of "Pneumonia" was in some instances supplemented by the nurse with the additional information of the existence of an acute infection such as whooping cough. The latter condition was given preference in our assignment. But where there was an actual conflict of causes in the two statements, preference was invariably given to that registered by the physician. Table II presents the number and per cent. of deaths by cause and by age at death.

TABLE II.
NUMBER AND PER CENT. OF DEATHS BY CAUSE AND BY AGE AT DEATH.

Infant's Last Number.	Cause of Death.	Deaths by Period of Life.									
		1st Year.		1st Day.		1st Week.		1st Month.		1st Quarter.	
		Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.
	All Causes.....	151	100.0	25	16.6	27	17.9	62	41.1	102	67.5
104	Diarrhea and enteritis.....	50	33.1	—	—	1	0.6	13	8.6	2	1.3
151	Congenital debility, icterus, and scelerema.....	21	13.9	—	—	13	8.6	17	11.3	24	15.9
	(1) Premature birth.....	17(6)	11.3	12	7.9	16	10.6	17	11.3	24	15.9
	(2) Congenital debility.....	14	9.3	1	0.6	1	0.6	7	4.6	11	7.3
91	Bronchopneumonia.....	16	10.6	—	—	—	—	—	—	—	—
152	Other causes peculiar to early infancy.....	15	9.9	—	—	15	9.9	15	9.9	—	—
	(1) Accidents of labor.....	8	5.3	3	1.9	8	5.3	8	5.3	—	—
	(2) Other causes peculiar to early infancy.....	7	4.6	5	3.3	7	4.6	7	4.6	—	—
92	Pneumonia (including lobes).....	8	5.3	—	—	4	2.6	7	4.6	—	—
150	Congenital malformations.....	8	5.3	—	—	—	—	—	—	—	—
	(1) Congenital malformations of the heart.....	6	4.0	3	1.9	3	1.9	5	3.3	1	0.6
	(2) Other congenital malformations.....	2	1.3	1	0.6	1	0.6	2	1.3	—	—
8	Whooping cough.....	7	4.6	—	—	—	—	1	0.6	—	—
89	Acute bronchitis.....	6	4.0	—	—	—	—	1	0.6	—	—
28	Tuberculosis of the lungs.....	2	1.3	—	—	—	—	—	—	—	—
	All other causes.....	8	5.3	—	—	—	—	3	1.9	3	1.9

(a) Eight additional premature births were reported in conjunction with other causes.

The largest number of deaths was due to the group of causes embraced by the designation "Diarrhea and Enteritis" (title 104 of the International List); 50 deaths are so recorded, or about one third of the total. Of these, 13 occurred during the first month of life and 29 during the second and third months. It would appear that the latter months constitute a particularly dangerous period for the infants, since it is then that the change from breast feeding to other methods commonly occurs.

Other observers have similarly found that babies born during the summer show a high mortality from intestinal disturbances during the early months of life. Doubtless the danger is aggravated by exposure to the summer heat. The mortality from this group of causes during the second, third, and fourth quarters of the first year was very much reduced, although by no means negligible.

The proportion of "Diarrhea and Enteritis" to "All Causes," 33.1 per cent., is considerably higher than that usually found in other localities. The figure may be compared with the following percentages for 1913 for the Registration Area and a number of large cities.

PERCENTAGE DEATHS FROM DIARRHEA AND ENTERITIS OF DEATHS FROM ALL CAUSES UNDER ONE YEAR OF AGE, 1913.

Registration Area, United States	24.1
New York City	23.4
Boston	22.3
Detroit	19.4

Verrill, in his report on Fall River conditions in 1908, found an even higher proportion than ours; namely, 38.3 per cent. of the total. The ratio of diarrhea and enteritis deaths to deaths from all causes under one year of age, as reported for Fall River by the Bureau of the Census for the entire year 1913, was 34.9. Verrill ascribed the excessive mortality from these causes to the ignorance of mothers in feeding their infants. All other causes, according to him, take a secondary place. We shall later on consider this question in order to determine from our data what effects have been exerted on the mortality by the various methods of feeding employed by mothers. We

are warranted at this time, however, in concluding that the proportion from diarrhea and enteritis is too high, and that it is capable of very marked reduction if attacked along lines similar to those now well established in New York City, Boston, and Detroit.

As might be expected from the large proportion of early deaths, the causes included under the designation "Congenital Debility, Icterus, and Sclerema" form a very important group. Together they embrace 20.5 per cent. of the deaths. Of the 31 deaths under this title, 17 were stated as "Premature Births" with no further qualification. Eight additional premature births were reported in conjunction with other causes, and preference was given to the more definite statement. Thus 3 additional deaths were due to "Atelectasis" and 2 more were ascribed to "Accidents of Labor." These 5 cases appear in our table under title 152 of the International List, "Other Causes Peculiar to Early Infancy." Of the 3 remaining premature births, 2 cases are assigned to "Congenital Debility" (title 151), and 1 case to "Diarrhea and Enteritis" (title 104). There were, therefore, 25 deaths of prematurely born children in the total of 151 deaths, or 16.6 per cent.; this is an extraordinarily high proportion. Of these 25 children, 22 died during the first week of life. It is interesting to note also that 46 deaths of the 62 which occurred in the first month are traceable either to "Premature Birth," "Congenital Debility," "Accidents of Labor," or congenital malformations of one kind or another. All these causes point with especial emphasis to prenatal conditions and to the character of the obstetrical treatment which mothers in Fall River receive.

The respiratory diseases comprise 16 cases of bronchopneumonia, 8 cases of unqualified or lobar pneumonia, and 6 cases of acute bronchitis, a total of 30 cases. Of this number only 9 occurred in the first half year of life and 21 in the second half year. It is quite possible that these cases have been increased in number at the expense of the acute infections of which they may have been terminal conditions, although every effort has been made to assign to the infections (such as whooping cough, diphtheria, etc.) those cases in which there was sufficient evidence to warrant such action.

The acute infections are represented by whooping cough to the number of 7 cases and by diphtheria in 1 case. There were 2 cases of pulmonary tuberculosis and 7 other cases due to as many different causes.

Contributory Factors in Mortality. Infant mortality is the resultant of a considerable number of contributory factors. Some of these are primarily biological in character; others are principally economic and social. In the very nature of the case it will be impossible to measure with any degree of accuracy the effect of each on the mortality, yet together they determine whether the infant death rate of a community shall be high or low. In our discussion we shall take up in sequence the following factors, and shall point out how they bear on the conditions which we have found to exist:

- (a) Attendance at delivery.
- (b) Infant feeding.
- (c) Age of mother.
- (d) Nativity of mother.
- (e) Occupation of mother.
- (f) Occupation and wages of father.

(a) The following table shows the facts of infant mortality according to whether physicians or midwives assisted at delivery:

TABLE III.
NUMBER OF BIRTHS, CORRECTED NUMBER OF BIRTHS, NUMBER OF DEATHS,
AND DEATH RATE, BY ATTENDANT AT BIRTH.

Attendant at Birth.	Number of Births.	Corrected Number of Births.(a)	Number of Deaths.	Rate per 1,000 Births.(a)
All Forms of Attendance....	802	746	151	202.4
Physician.....	507	483	96	198.8
Midwife.....	294	239	45	188.3
Other and unknown.....	41	24	10	—

(a) Correction has been made in this and in subsequent tables (except in Table IV) for the 116 cases lost from observation. The death rate for the entire group, 202.4, is slightly different from that given in Table I, because of the use of 746 instead of 746.4 as the denominator.

It would appear that the children born with physicians in attendance exhibited a much higher mortality rate than those born under the care of midwives. The numbers coming under the other heads are not sufficiently large to warrant their inclusion in the table. A considerable proportion, 49 per cent., of the deaths among the children born under the care of physicians occurred during the first month of life; the corresponding figure for those born with midwives in attendance was only 27 per cent. It is to be assumed that these differences are primarily the result of a process of selection, physicians having been called in those cases which presented special difficulties for either mother or child. Such cases would naturally show a higher death rate during the first year of life.

(b) So much importance has been ascribed to feeding that most investigations of infant mortality have resolved themselves into studies of the mode of feeding. Whether the child is breast fed or artificially fed, and how long breast feeding is carried on, are the best indices of the infant death rate to be expected. Such, in particular, were the findings of Verrill in his painstaking analysis of the situation in Fall River for the year 1908. He attributes the excessive mortality among the children of mothers at home to the absence of nursing and to improper feeding and improper care. "The much higher mortality among children of the mothers who went to work after childbirth," he says, "is plainly due chiefly to the greater extent of the absence of breast feeding and of the improper feeding and the additional evil influence of the withdrawal of the mother's care."

Our own analysis leads to an identical conclusion. Beginning with the second week of life, infant feeding is clearly the chief factor in the mortality. From this period onward, all other considerations take a secondary place. In the following table we have analyzed the mortality of the children as to whether they were breast fed or artificially fed, in whole or in part, at successive periods. We have for obvious reasons eliminated from this analysis the 116 infants who were lost sight of during the year. Nor have we considered the 37 infants that died during the first week, since they would hardly

reflect the influence of feeding. At the initial period, namely, the beginning of the second week, there remained for consideration 649 infants. These are traced to the conclusion of the first year or to earlier death. The death rates at each period show how markedly the mode of feeding affects the chances of survival.

TABLE IV.
NUMBER ALIVE AT TIME STATED, NUMBER OF DEATHS DURING REMAINDER OF YEAR, AND DEATH RATE, BY MODE OF FEEDING.

Mode of Feeding at Time Stated.	Number Alive at Time Stated.	Number of Deaths During Remainder of Year.	Rate per 1,000 Alive at Time Stated.
Beginning of 2d week: Total.....	649	114	175.7
(a) Breast feeding.....	565	74	131.0
(b) Artificial and mixed feeding.....	76	32	421.1
(c) Unknown.....	8	8	—
Beginning of 3d month: Total.....	624	89	142.6
(a) Breast feeding.....	514	32	101.2
(b) Artificial and mixed feeding.....	105	22	204.8
(c) Unknown.....	5	5	—
Beginning of 4th month: Total.....	584	49	83.9
(a) Breast feeding.....	495	28	61.2
(b) Artificial and mixed feeding.....	178	22	123.6
(c) Unknown.....	1	1	—
Beginning of 7th month: Total.....	573	38	66.3
(a) Breast feeding.....	368	18	48.9
(b) Artificial and mixed feeding.....	205	20	97.6
Beginning of 10th month: Total.....	548	12	22.7
(a) Breast feeding.....	335	7	20.9
(b) Artificial and mixed feeding.....	213	6	28.2

It is obvious, from the above table, that the breast fed infants are at every period better endowed for living than are the artificially fed. Furthermore, the seriousness of the handicap of the latter depends upon the shortness of the duration of breast feeding. Infants that were already artificially fed at the beginning of the second week showed the highest mortality, namely, 421.1 per 1,000. The corresponding rate of the breast fed was 131.0—less than one third as high.

At the beginning of the second month, the rates for the breast fed and the artificially fed infants were reduced to 101.2 and 204.8 respectively. The rate for the artificially fed was still three times as great as that for the other infants. At the beginning of the fourth month, the artificially fed children suffered from a mortality almost twice that of the

breast fed. This condition continued until the beginning of the seventh month. At the beginning of the tenth month, the difference in the death rates was comparatively slight for the two modes of feeding.

It is noteworthy that, of the 535 children that survived the year, 350, or 65.4 per cent., were breast fed for at least 6 months. Of this number, 328 were breast fed for at least 9 months. Breast feeding not only determines the chances of survival during the first year, but also affects the condition of the survivors at the end of the year. Of the 535 infants, 489 were in good condition at the beginning of the second year, 19 were said to be in fair condition, and 27 were poor. Of these 27, 17 were breast fed less than 6 months and 13 less than 3 months. It is in this way, perhaps, that the mode of feeding, in the first year, makes its influence felt on the mortality of the second and subsequent years.

(c) The age of the mother also influences the mortality of infants during the first year of life, as is shown in the following table:

TABLE V.
NUMBER OF BIRTHS, CORRECTED NUMBER OF BIRTHS, NUMBER OF DEATHS, AND DEATH RATE, BY AGE OF MOTHER.

Age of Mother.	Number of Births.	Corrected Number of Births.	Number of Deaths.	Rate per 1,000 Births.
All Ages.....	802	746	151	202.4
Under 20.....	33	29	3	103.4
20-29.....	408	386	73	189.1
30-39.....	267	257	53	206.2
40 and over.....	37	36	8	222.2
Unknown.....	57	58	14	—

The lowest death rate occurred among infants of mothers whose age was 20 and under; but this figure is hardly trustworthy in view of the small number of cases under observation. From age 20 onward, the mortality increased regularly with the age of the mother, the highest rate being among infants of mothers at ages 40 and over.

It is difficult to interpret the above rates in view of the many conflicting factors that enter into the discussion. In the first

place, it is proper to assume that the knowledge and skill of mothers in infant rearing increases with age. Other conditions, however, are apparently of sufficient force to more than negative the favorable effect of the increased experience of the mother. It is possible that with successive pregnancies the inherent weaknesses transmitted by mothers to their offspring become more pronounced. In addition, economic and social conditions, certainly among industrial workers, become more acute as the family increases in number, so that the vitality of the infant is impaired, not only through its prenatal but also through its postnatal environment. In any case, it is interesting to observe that a higher infant death rate has been noted by many authors to be correlated with the advancing age of mothers.

(d) The mortality of infants of foreign born mothers has been shown to be considerably higher than that of infants of native mothers in a number of American communities, including New York City, Boston, and Johnstown. The following table for Fall River confirms these findings:

TABLE VI.
NUMBER OF BIRTHS, CORRECTED NUMBER OF BIRTHS, NUMBER OF DEATHS, AND DEATH RATE, BY NATIVITY OF MOTHER.

Nativity of Mother.	Number of Births.	Corrected Number of Births.	Number of Deaths.	Rate per 1,000 Births.
All Countries.....	802	746	151	202.4
United States.....	253	242	37	152.9
Portugal and Azores.....	182	174	52	298.9
Canada.....	151	145	25	172.4
All other countries.....	216	185	37	200.0

The lowest mortality rate is found among infants of native mothers; the highest rate is among infants whose mothers came from Portugal and the Azores, reaching the unprecedented figure of 299 per 1,000. The inclusion "All Others," for which the rate is 200 per 1,000, embraces a considerable number of nationalities. Thirteen countries in all are represented, but the numbers for the individual countries under this heading are too small to warrant special treatment.

It is not our view that the fact of nationality is itself sufficient to determine the above differences. Foreign born mothers are probably as well equipped physically to bear healthy offspring as are native mothers. It is rather to be inferred that the mother's nativity is correlated with other conditions which play a very decisive part in determining the infant death rate. The foreign born mother in Fall River, for example, is more likely to work in the mills during pregnancy, to have many children, and to live in crowded and unhygienic quarters. She, more than the native mother, reflects the injurious influences of an unfavorable industrial and economic environment. We find, accordingly, that the excessive deaths of the infants of foreign born mothers are due especially to pneumonia, to diarrhea and enteritis, and to premature birth and congenital debility.

We may illustrate the above with reference to the infants of Portuguese mothers, who showed the highest death rate. Of the 182 mothers, 72, or 39 per cent., were engaged in work outside of the household during pregnancy, while only 17 per cent. of the mothers of other nationalities were so engaged. Of the 52 deaths of Portuguese children, 20 were due to diarrhea and enteritis, 17 to pneumonia and bronchitis, and 13 to prematurity, congenital debility, and other causes peculiar to early infancy.

(e) The participation of the mother in gainful work during pregnancy has been the subject of numerous investigations, from which the conclusion has usually been drawn that such work involves a high infant death rate as a consequence. We have, therefore, examined with special interest the data at our disposal, in order to determine, if possible, the relation existing between occupation of mother and infant mortality. The following table presents our results:

TABLE VII.
NUMBER OF BIRTHS, CORRECTED NUMBER OF BIRTHS, NUMBER OF DEATHS, AND
DEATH RATE, BY OCCUPATION OF MOTHER.

Occupation of Mother.	Number of Births.	Corrected Num- ber of Births.	Number of Deaths.	Rate per 1,000 Births.
All Occupations.....	802	746	151	202.4
Housekeepers.....	601	567	91	160.5
Gainfully employed.....	175	169	51	302.6
Unknown.....	26	11	9	

There can be no question that the infants whose mothers were gainfully employed showed a much higher death rate than those whose mothers were engaged in housework only. Further examination discloses that those gainfully employed were almost entirely mill workers. It has therefore seemed unnecessary to bring into relief the small number of working mothers engaged outside of the mills. It has been impossible to determine from the schedules, with any degree of accuracy, how long before childbirth the employed mothers quit work, or how soon after childbirth work was resumed. We have therefore disregarded these important considerations in our table, illuminating though their analysis would have been.

(f) We are here concerned with the father not so much as a factor in the inheritance of the child, as in his character of a provider who determines the economic conditions of the household. That these conditions play a part in mortality, both during infancy and later, has generally been agreed. The highest death rates are found in the wards of cities where poverty is most common; the converse also holds good. These findings have recently received striking confirmation in the Children's Bureau study of Johnstown. The literature, and especially the German, is replete with trustworthy references to the strong positive correlation between low family income and high infant mortality. For it is the factor of income which determines the number of rooms occupied, their location in the city, the amount and character of the food, the need for supplementary work by the mother outside the home, and other considerations which bear directly upon infant mortality.

Unfortunately the data at our disposal did not lend themselves to an investigation of the mortality by amount of father's earnings, since a large proportion of the schedules did not give the wages of the father. It was possible, nevertheless, to get a measure of this item indirectly by analyzing the occupations of fathers. A multitude of occupations were, to be sure, represented, but the largest number of fathers were engaged in textile work. There were, for example, 169 mill operatives, 79 weavers, and 29 doffers and spinners. In all, there were 360 men employed in the mills. It was thought safe to combine these into one group for the purpose of our analysis. We did not include mill overseers, mill clerks, drivers of mill teams, etc. In other words, our group was made fairly homogeneous in its inclusion of inside mill operatives.

As opposed to them, 400 other fathers, engaged in a number of varied occupations, were brought together. They included a few professional men, clerks, carpenters, etc. This latter group is obviously heterogeneous, including the lowest paid as well as the best paid men in the community. Although the difficulties involved in drawing conclusions from such a contrast are obvious, the method will serve its purpose if it does no more than to indicate the singular condition prevailing among textile workers with reference to the mortality of their infants.

TABLE VIII.
NUMBER OF BIRTHS, CORRECTED NUMBER OF BIRTHS, NUMBER OF DEATHS, AND
DEATH RATE, BY OCCUPATION OF FATHER.

Occupation of Father.	Number of Births.	Corrected Num- ber of Births.	Number of Deaths.	Rate per 1,000 Births.
All Occupations.....	802	746	151	202.4
Textile occupations.....	360	342	69	201.8
Other occupations.....	440	379	70	184.7
Unknown.....	42	25	12	

The findings of other observers are again confirmed. There is a difference of 17 deaths per 1,000 in favor of the infants of non-textile workers.

Of the 360 men engaged in textile work, the weekly wages were stated in 72 cases. The operatives, of whom there were 34, averaged \$10.08, the 17 weavers averaged \$10.23, and a number of others averaged \$10.67. The average weekly wage for the group of 72 was \$10.22. This figure is based on a return of only 20 per cent. of the total cases, and may not be entirely reliable, yet it is doubtless sufficiently accurate as an estimate. The earnings cited show very little variation from the average. They are considerably above the figures for textile workers furnished by the Federal Bureau of the Census and the figures furnished by the Bureau of Labor Statistics of Massachusetts.

It will not take us too far afield in the discussion of economic theory to note that this average weekly wage is too low to maintain a family in good health. It is not surprising, therefore, to find that 98 of the wives of the textile workers were engaged in work outside of their homes; this is 27 per cent. of the total. In only 17 per cent. of the cases in the other group were the wives so occupied. If, as has been shown above, the infant mortality is higher where mothers are engaged in outside work, we have discovered, in the low earnings of the father, one more link in the vicious chain of causes which place the infant mortality of Fall River among the highest in the country.

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